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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09 735,131	12 12 2000	David M. Hoffman	15-CT-5233	5524

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EXAMINER

HANNAHER, CONSTANTINE

ART UNIT PAPER NUMBER

2878

DATE MAILED: 09/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/735,131

Applicant(s)

HOFFMAN, DAVID M.

Examiner

Constantine Hannaher

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 22 July 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 12 December 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION**Drawings**

1. Figs. 1, 2, 3, and 4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Note the use of "One aspect of the present invention is..." which can be implied.

Claim Objections

3. Applicant is advised that should claim 15 be found allowable, claim 20 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4, 6, 15-24, 26, and 27 are rejected under 35 U.S.C. 103(a) as being obvious over Hoffman *et al.* (US006144718A) in view of Schafer *et al.* (US006091795A).

With respect to independent claim 1, Hoffman *et al.* discloses a finished detector module assembly **20** (Fig. 4) suitable for use in a computed tomography (CT) imaging system (Fig. 2) comprising a substrate **100**, an array of photosensors **66** mounted on the substrate **100** (Fig. 5), an array of scintillators **74** optically coupled to the photosensor array (column 3, lines 18-19), and a flexible electrical cable **70** electrically coupled to the photosensor array. Although scintillators **74** are positioned "above" and "adjacent" photodiodes **66** (column 3, line 16), Hoffman *et al.* does not explicitly state that a gap is present. Nevertheless, in a finished detector module assembly suitable for use in a CT imaging system, the presence of a gap filled with a member of the recited group is completely well known. Schafer *et al.* discloses finished detector module assembly **10** suitable for use in a CT imaging system (Fig. 6, column 5, line 64). The assembly **10** of Schafer *et al.* (Fig. 1-4) comprises a substrate **12**, an array **14** of photosensors mounted on the substrate, an array **18** of scintillators **22** optically coupled to the photosensor array and separated therefrom by a gap ("region") containing medium **34**. The medium **34** is "air" (column 7, line 50) or silicone which qualifies as compliant based on its physical properties and clear based on the requirement of Schafer *et al.* for "optically transmissive" at column 7, lines 49-50. The standoff between the photodiode

array and the scintillator crystal assembly in Schafer *et al.* protects fragile elements like wire leads **19**. The assembly **20** of Hoffman *et al.* likewise has fragile elements (for example, wire bonds **300**) thereon which one of ordinary skill in the art would have found obvious to protect when packing a plurality of photodiodes **66** and adjacent scintillators **74** together. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the assembly **20** of Hoffman *et al.* to comprise a separation between the photosensor array and the array of scintillators to protect relatively fragile features on the photosensor array as suggested by Schafer *et al.*, and further to fill the gap with a member from the recited group to facilitate transmission of light as suggested by Schafer *et al.*

With respect to dependent claim 2, the assembly **10** of Schafer *et al.* further comprises a clamping mechanism (grids **24** and **28**) clamping the array of scintillators **22** in place above and aligned with (Fig. **4**) the photosensor array. In view of the structural support and stability suggested by Schafer *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the assembly **20** of Hoffman *et al.* to further comprise such a clamping mechanism.

With respect to dependent claim 3, the clamping mechanism suggested by Schafer *et al.* is "placed over" the photodiode array. Adhesively affixing the grid **28** to the substrate would have been obvious in view of the reference to the curing of epoxies in the plural at column 8, line 24 and the desire for dimensional stability.

With respect to dependent claim 4, the thermal coefficient of expansion of the clamping mechanism suggested by Schafer *et al.* is relatively low (column 6, line 65). Since this lends structural support and stability to the detector array, and not just the scintillators **22**, it is considered that the "relatively" in the comparison made by Schafer *et al.* is with respect to the substrate **12**.

With respect to dependent claim 6, the assembly suggested by Schafer *et al.* fills the gap with air (column 7, line 50 and column 8, line 31).

With respect to dependent claim 15, the assembly suggested by Schafer *et al.* fills the gap with a compliant, clear film (column 7, line 50 and column 8, line 31).

With respect to dependent claim 16, the materials suggested by Schafer *et al.* for the medium **34** (for example, silicone or epoxy) are recognized as adhesive films.

With respect to dependent claim 17, the assembly suggested by Schafer *et al.* fills the gap with a compliant, clear film (column 7, line 50 and column 8, line 31).

With respect to dependent claims 18 and 19, the medium **34** suggested by Schafer *et al.* is one or more of the recited materials (column 7, lines 50-51 and column 8, line 31-32).

With respect to dependent claim 20, as to "further comprising" a flexible electrical cable electrically coupled to the photosensor array, such a cable is unambiguously demanded by line 8 of claim 1. The assembly **10** of Schafer *et al.* further comprises a clamping mechanism (grids **24** and **28**) clamping the array of scintillators **22** in place above and aligned with (Fig. **4**) the photosensor array. In view of the structural support and stability suggested by Schafer *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the assembly **20** of Hoffman *et al.* to further comprise such a clamping mechanism.

With respect to independent claim 21, Hoffman *et al.* suggests a method for making the illustrated finished detector module **20** suitable for use in CT imaging systems, in which the module **20** includes an array of photosensors **66** optically coupled to an array of scintillators **74**, which would comprise the steps of disposing photosensor array **66** to a substrate **100**, electrically bonding a flexible cable **70** to the photosensor array **66**, and placing a scintillator array **74** on top of the photosensor array. Although scintillators **74** are positioned "above" and "adjacent" photodiodes **66**

(column 3, line 16), Hoffman *et al.* is silent as to any adhesion or the presence of a preformed, compliant, clear film. Nevertheless, in a method of making a finished detector module suitable for use in a CT imaging system, the presence of adhesives and a preformed, compliant, clear film is suggested by Schafer *et al.* Schafer *et al.* disposes photodiodes **14** arranged in a two-dimensional array on top of the substrate **12** (column 8, lines 6-7). Adhesively affixing the photodiodes **14** to the substrate **12** would have been obvious in view of the reference to the curing of epoxies in the plural at column 8, line 24 and the desire for dimensional stability. The presence of a film is disclosed at column 7, lines 42-50. The film is clear based on the requirement of Schafer *et al.* for "optically transmissive" at column 7, lines 49-50. The film is compliant based on the physical properties of a medium **34** such as silicone. The film is preformed in view of the desire to control the quantity thereof used in assembling the module and quality assurance in matching the size of the interface between scintillators and photosensors. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the making of the module **20** of Hoffman *et al.* to comprise a step of performing a compliant, clear film as suggested by Schafer *et al.* and a step of placing the preformed film on top of the photosensor array in order to effect separation between the photosensor array and the array of scintillators to protect relatively fragile features on the photosensor array and facilitate transmission of light as suggested by Schafer *et al.*

With respect to dependent claim 22, epoxy is a known material for the preformed, compliant, clear film suggested by Schafer *et al.* (column 7, line 51). Adhesion is a recognized property thereof.

With respect to dependent claim 23, the assembly **10** of Schafer *et al.* further comprises a clamping mechanism (grids **24** and **28**) clamping the array of scintillators **22** in place above and aligned with (Fig. **4**) the photosensor array. In view of the structural support and stability suggested

by Schafer *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of making the module **20** of Hoffman *et al.* to further comprise a step of including such a clamping mechanism. The clamping mechanism suggested by Schafer *et al.* is "placed over" the photodiode array. Adhesively bonding the grid **28** to the substrate would have been obvious in view of the reference to the curing of epoxies in the plural at column 8, line 24 and the desire for dimensional stability.

With respect to dependent claim 24, the thermal coefficient of expansion of the clamping mechanism suggested by Schafer *et al.* is relatively low (column 6, line 65). Since this lends structural support and stability to the detector array, and not just the scintillators **22**, it is considered that the "relatively" in the comparison made by Schafer *et al.* is with respect to the substrate **12**.

With respect to independent claim 26, Hoffman *et al.* suggests a method for making the illustrated finished detector module **20** suitable for use in CT imaging systems, in which the module **20** includes an array of photosensors **66** optically coupled to an array of scintillators **74**, which would comprise the steps of disposing photosensor array **66** to a substrate **100**, electrically bonding a flexible cable **70** to the photosensor array **66**, and placing a scintillator array **74** on top of the photosensor array. Although scintillators **74** are positioned "above" and "adjacent" photodiodes **66** (column 3, line 16), Hoffman *et al.* is silent as to any air gap or the presence of any clamping mechanism. Nevertheless, in a method of making a finished detector module suitable for use in a CT imaging system, the presence of an air gap and a clamping mechanism is suggested by Schafer *et al.* Schafer *et al.* disposes photodiodes **14** arranged in a two-dimensional array on top of the substrate **12** (column 8, lines 6-7) and a clamping mechanism (grids **24** and **28**) clamping the array of scintillators **22** in place above and aligned with (Fig. 4) the photosensor array with an air gap (column 7, line 50 and column 8, line 31). In view of the structural support and stability suggested by Schafer *et al.*, it

would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of making the module **20** of Hoffman *et al.* to further comprise a step of including such a clamping mechanism. The clamping mechanism suggested by Schafer *et al.* is "placed over" the photodiode array. Adhesively bonding the grid **28** to the substrate would have been obvious in view of the reference to the curing of epoxies in the plural at column 8, line 24 and the desire for dimensional stability.

With respect to dependent claim 27, the thermal coefficient of expansion of the clamping mechanism suggested by Schafer *et al.* is relatively low (column 6, line 65). Since this lends structural support and stability to the detector array, and not just the scintillators **22**, it is considered that the "relatively" in the comparison made by Schafer *et al.* is with respect to the substrate **12**.

6. Claims 5, 25, and 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman *et al.* (US006144718A) and Schafer *et al.* (US006091795A) as applied to claims 3, 24, and 26 above, and further in view of Wieczorek *et al.* (US006252927B1).

With respect to dependent claims 5, 25, and 28, the clamping mechanism suggested by Schafer *et al.* comprises a glass (column 7, line 1) which is "silica" but does not suggest the inclusion of a titanium oxide. Titanium, and specifically a titanium oxide, is recognized as useful by Schafer *et al.* for optical reflectivity contributing to opacity (column 8, lines 32-34 and column 7, lines 33-37). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made that a glass-based material for the grid **28** contain titanium oxide to achieve the critical feature of optical opacity. Hoffman *et al.* leaves the composition of the scintillators **74** to those "known in the art" (column 3, line 15). Yttrium gadolinium oxide is a known material for scintillators in a CT imaging system, as shown by Wieczorek *et al.* at column 1, lines 21-22. Since YGO is a typical material among a variety of effective performance, it would have been obvious to

one of ordinary skill in the art at the time the invention was made to specify YGO as the scintillator material known in the art used for the scintillators **74** in the assembly **20** of Hoffman *et al.* The scintillators **22** suggested by Schafer *et al.* comprise an epoxy reflector material (column 7, lines 32-36). Hoffman *et al.* does not identify a material for the substrate **100**. The substrate suggested by Schafer *et al.* comprises a ceramic (column 7, line 57).

7. Claims 7-10 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman *et al.* (US006144718A) and Schafer *et al.* (US006091795A) as applied to claims 6 and 26 above, and further in view of Iwanczyk *et al.* (US005773829A).

With respect to dependent claim 7, Schafer *et al.* does not describe any other preparation for the facing surfaces of the photosensor array and array of scintillators. Nevertheless, when scintillators confront photodiodes over a gap filled with a medium, it is known to coat at least one of the facing surfaces with an antireflection film, as shown by Iwanczyk *et al.* at column 9, lines 25-27. In view of the maximization of the quantum efficiency of the photodiodes suggested by Iwanczyk *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the assembly suggested by Hoffman *et al.* and Schafer *et al.* to comprise an antireflection film on at least one of the facing surfaces.

With respect to dependent claims 8-10, while Iwanczyk *et al.* explicitly discloses coating the surface of the photosensor array with an antireflection film (column 9, lines 25-27), it would have been obvious to one of ordinary skill in the art at the time the invention was made to coat any or every surface at which the index of refraction changed (as between the scintillator and the medium **34** suggested by Schafer *et al.*) instead of or in addition to the coating suggested by Iwanczyk *et al.* in view of the improvements in quantum efficiency expected.

With respect to dependent claim 29, Schafer *et al.* does not describe any other preparation for the facing surfaces of the photosensor array and array of scintillators. Nevertheless, when scintillators confront photodiodes over a gap filled with a medium, it is known to coat at least one of the facing surfaces with an antireflection film, as shown by Iwanczyk *et al.* at column 9, lines 25-27. In view of the maximization of the quantum efficiency of the photodiodes suggested by Iwanczyk *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of making the module suggested by Hoffman *et al.* and Schafer *et al.* to comprise the step of coating an antireflection film on at least one of the facing surfaces.

8. Claims 11-14 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman *et al.* (US006144718A) and Schafer *et al.* (US006091795A) and Iwanczyk *et al.* (US005773829A) as applied to claims 7 and 29 above, and further in view of Yamashita *et al.* (US004823016A).

With respect to dependent claim 11, Schafer *et al.* does not describe any other preparation for the facing surfaces of the photosensor array and array of scintillators. Nevertheless, when scintillators confront photosensors over a gap filled with a medium, it is known to polish at least one of the facing surfaces, as shown by Yamashita *et al.* at column 4, lines 19-20. In view of the improved transmission of light out of the scintillators as would be recognized by those of ordinary skill in the art from the disclosure of Yamashita *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the assembly suggested by Hoffman *et al.* and Schafer *et al.* and Iwanczyk *et al.* to comprise a polished surface on at least one of the facing surfaces.

With respect to dependent claims 12-14, while Yamashita *et al.* explicitly discloses polishing the surface of the scintillator array **12** (column 4, lines 19-20), it would have been obvious to one of

ordinary skill in the art at the time the invention was made to polish any or every surface at which the index of refraction changed (as between the scintillator and the medium **34** suggested by Schafer *et al.*) instead of or in addition to the polishing suggested by Yamashita *et al.* in view of the improvements in light transmission expected.

With respect to dependent claim 30, Schafer *et al.* does not describe any other preparation for the facing surfaces of the photosensor array and array of scintillators. Nevertheless, when scintillators confront photosensors over a gap filled with a medium, it is known to polish at least one of the facing surfaces, as shown by Yamashita *et al.* at column 4, lines 19-20. In view of the improved transmission of light out of the scintillators as would be recognized by those of ordinary skill in the art from the disclosure of Yamashita *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of making the module suggested by Hoffman *et al.* and Schafer *et al.* and Iwanczyk *et al.* to comprise the step of polishing at least one of the facing surfaces.

Response to Submission(s)

9. This application has been published as US2002/0070343A1 on June 13, 2002.

10. Applicant's arguments with respect to claims 1-30 have been considered but are moot in view of the new ground(s) of rejection.

Nevertheless it should be pointed out that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Peter *et al.* (US006362480B1) shows that the presence of a compliant, clear film **104** is routine in the art of interfacing a photosensor array **101** with an array **102** of scintillator tiles **103** within a finished detector module assembly **22** suitable for use in CT imaging systems (title).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Constantine Hannaher whose telephone number is (703) 308-4850. The examiner can normally be reached on Monday-Friday with flexible hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (703) 308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

ch
September 17, 2002

Constantine Hannaher
/ s /